

Amendments to the Drawings:

The attached replacement drawing sheets make changes to Fig. 3 and replace the original sheets.

Attachment: Replacement Sheets

REMARKS

Claims 1 and 3-14 are pending in this application. Applicant appreciates the Office Action's indication that claims 5, 8 and 11 contain allowable subject matter.

By this Amendment, claim 1 is amended for clarity and to incorporate the subject matter recited in claim 2. Claim 2 is canceled. Claim 3 is amended to depend from claim 1.

Claim 10 is amended for clarity. Claims 5-9 and 11-14 are amended to improve clarity.

Fig. 3 is amended, as the Examiner requested. The specification is amended in view of the amendments to Fig. 3. The amendments to Fig. 3 and the specification are based on common knowledge of one of ordinary skill in the art, and to make explicit what was implicitly disclosed in Fig. 3. For example, the unlabeled elements are symbols known to represent resistors. (See the attached excerpts from documents downloaded from the Internet.) No new matter is added.

Applicant thanks Examiner Mai for the courtesy extended to Applicant's representative, Mr. Luo, during the May 14, 2007 telephone interview. Fig. 3 is amended based on Examiner Mai's suggestions during the telephone interview.

The Office Action objects to the drawings. During the May 14 telephone interview, Examiner Mai indicated that Fig. 3 contains elements that are not labeled. Fig. 3 is amended to provide reference numbers to the unlabeled elements, as Examiner Mai requested. Examiner Mai also indicated that there is no need to amend other figures at this point. Accordingly, withdrawal of the objection to the drawings is respectfully requested.

The Office Action rejects claims 1 and 10 under 35 U.S.C. §112, second paragraph, and under 35 U.S.C. §101. Claims 1 and 10 are amended to overcome these rejections.

Accordingly, withdrawal of the rejection of claims 1 and 10 under 35 U.S.C. §112, second paragraph, and under 35 U.S.C. §101, is respectfully requested.

The Office Action rejects claims 1-4, 6, 7, 9, 10 and 12-14 under 35 U.S.C. §102(b) over DE 19833439 over Heidenhain. This rejection is respectfully traversed.

Claim 1 is amended for clarity, and to incorporate the subject matter of claim 2. As amended, claim 1 recites "a detector array for detecting the patterned reference mark, the detector array comprising at least two sets of detector elements, each set being formed as a pattern which relates to the pattern of the reference mark," and "a subtractor, for subtracting the summed output from a second of the sets from the summed output of a first of the sets." Heidenhain does not disclose or suggest these features.

Fig. 2A of Heidenhain discloses a first set of detector elements (D100, D101, D106 and D107) which are in a pattern relating to the pattern of the reference mark (7.1, 7.5, 7.11, 7.13). However, there is only one set of detector elements in such a pattern and not two as required in claim 1. Likewise, in Fig. 3A, there is only one set of detector elements formed as a pattern which relates to the pattern of the reference mark (G_{REF}, G_{REF2}, G_{REF3}, G_{REF4}). Thus, Heidenhain does not disclose "a detector array for detecting the patterned reference mark, the detector array comprising at least two sets of detector elements, each set being formed as a pattern which relates to the pattern of the reference mark," as recited in claim 1.

Also, in Fig. 2A of Heidenhain, the sum of a first set of detector elements (D100, D101, D106, and D107) arranged in a pattern relating to the pattern of the reference mark is input into a subtractor DIF30 and the sum of the outputs of the detector elements D102-D104, which are used to generate an incremental signal, is also input into the subtractor DIF30. However, these detector elements D102-D104 are not arranged in a pattern which relates to the pattern of the reference mark.

In Fig. 3A of Heidenhain, the sum of a first set of detector elements (G_{REF1} , G_{REF2} , G_{REF3} , G_{REF4}) arranged in a pattern relating to the pattern of the reference mark is input into a subtractor DIF3 and the sum of the output of all the detector elements (D1-D44) is also input into the subtractor DIF30. However, the detector elements D1-D44 are not arranged in a pattern which relates to the pattern of the reference mark.

In view of the above, Heidenhain does not disclose "a subtractor, for subtracting the summed output from a second of the sets from the summed output of a first of the sets," as recited in claim 1.

The features of claim 1 have the effect of improving the accuracy of the reference mark signal. This is achieved by taking the difference between the two sets of detector elements, both of which relate to the pattern of the reference mark. This has the result of producing a signal with a zero-crossing which can be used to give accurate positional information.

On the other hand, the purpose of the arrangements of detector elements in Figs. 2A and 3A of Heidenhain is to eliminate the periodic incremental signal component in the reference pulse signal, to thereby increase reliability of detection of the reference mark signal, as described in col. 3, lines 35-39 and col. 12, lines 1-19. Thus, Heidenhain does not suggest the subject matter recited in claim 1.

Regarding claim 10, claim 10 is amended to recite that a circuitry is provided for producing a signal from the outputs of the elements, the signal having a value which crosses zero when the reference mark is detected by the reference mark detector. Heidenhain does not disclose or suggest any circuitry which produces a signal having a value which crosses zero. Thus, Heidenhain does not disclose each and every element recited in claim 10.

For at least the above reasons, Heidenhain does not disclose or suggest the subject matter recited in claims 1 and 10, and claims 3, 4, 6, 7, 9 and 12-14 depending therefrom.

Accordingly, withdrawal of the rejection of claims 1, 3, 4, 6, 7, 9, 10 and 12-14 under 35 U.S.C. §102(b) is respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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JAO:GXL/gml

Attachments:

Replacement Sheets
Petition for Extension of Time
Website printouts

Date: May 17, 2007

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<p>DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461</p>
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Resistor

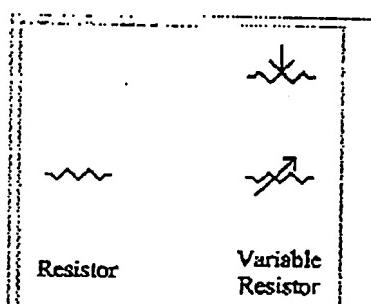
From Wikipedia, the free encyclopedia

A resistor is a two-terminal electrical or electronic component that resists an electric current by producing a voltage drop between its terminals in accordance with Ohm's law: $R = \frac{V}{I}$

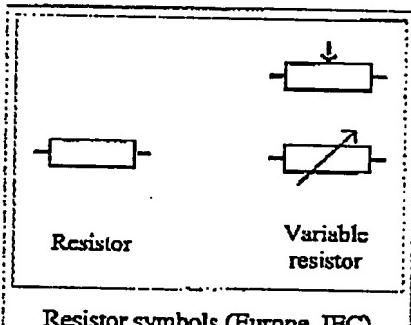
The *electrical resistance* is equal to the voltage drop across the resistor divided by the current through the resistor. Resistors are used as part of electrical networks and electronic circuits.

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Resistor symbols (non-European)



Resistor symbols (Europe, IEC)



Axial-lead resistors on tape. The tape is removed during assembly before the leads are formed and the part is inserted into the board.

Identifying resistors

Most axial resistors use a pattern of colored stripes to indicate resistance. Surface-mount ones are marked numerically. Cases are usually brown, blue, or green, though other colors are occasionally found such as dark red or dark gray.

One can use a multimeter or ohmmeter to test the values of a resistor.

Resistor standards

- MIL-R-11
- MIL-R-39008
- MIL-R-39017

Switches		
Component	Circuit Symbol	Function of Component
<u>Push Switch</u> (push-to-make)		A push switch allows current to flow only when the button is pressed. This is the switch used to operate a doorbell.
<u>Push-to-Break</u> Switch		This type of push switch is normally closed (on), it is open (off) only when the button is pressed.
<u>On-Off Switch</u> (SPST)		SPST = Single Pole, Single Throw. An on-off switch allows current to flow only when it is in the closed (on) position.
<u>2-way Switch</u> (SPDT)		SPDT = Single Pole, Double Throw. A 2-way changeover switch directs the flow of current to one of two routes according to its position. Some SPDT switches have a central off position and are described as 'on-off-on'.
<u>Dual On-Off</u> Switch (DPST)		DPST = Double Pole, Single Throw. A dual on-off switch which is often used to switch mains electricity because it can isolate both the live and neutral connections.
<u>Reversing</u> Switch (DPDT)		DPDT = Double Pole, Double Throw. This switch can be wired up as a reversing switch for a motor. Some DPDT switches have a central off position.
<u>Relay</u>		An electrically operated switch, for example a 9V battery circuit connected to the coil can switch a 230V AC mains circuit. NO = Normally Open, COM = Common, NC = Normally Closed.

Resistors		
Component	Circuit Symbol	Function of Component
<u>Resistor</u>		A resistor restricts the flow of current, for example to limit the current passing through an LED. A resistor is used with a capacitor in a timing circuit. Some publications still use the old resistor symbol:
<u>Variable Resistor</u>		This type of variable resistor with 2 contacts (a rheostat) is usually used to control current. Examples include: adjusting lamp